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PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION
BERKELEY - CALIFORNIA

RESEARCH NOTE

No. 149

July 1959

# BITTERBRUSH PLANTS CAN BE PROPAGATED FROM STEM CUTTINGS[1/]

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Good seed is essential in crop production whether it be for agriculture or deer browse on wildlands. But seed production in bitterbrush (Purshia ssp.), an ice cream plant on western ranges, is erratic and unpredictable. Even well-filled seed may be worthless or at best produce seedlings unable to survive under natural conditions. These obstacles have slowed down reseeding success on deer winter ranges but have stimulated efforts to find other ways of propagating bitterbrush. Recent tests have shown how to propagate this plant from stem cuttings.

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## The Test

Cuttings were taken from 8- to 11-year old field-grown, and 1- and 2-year old greenhouse-grown antelope bitterbrush (P. tridentata). Only greenhouse stock of desert bitterbrush (P. glandulosa) was used. The greenhouse plants were in full leaf and some were in flower; the field plants were either dormant or had new leaves just starting.

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1/ Contribution from cooperative investigation between the Pacific Southwest Forest and Range Experiment Station and the California Department of Fish and Game. Work was done under Federal Aid in Wildlife Restoration Act, Pittman-Robertson Research Project W51R, entitled "Game Range Restoration."

Acknowledgement: Most propagating facilities and daily maintenance were furnished by the University of California Botanical Gardens at Berkeley.

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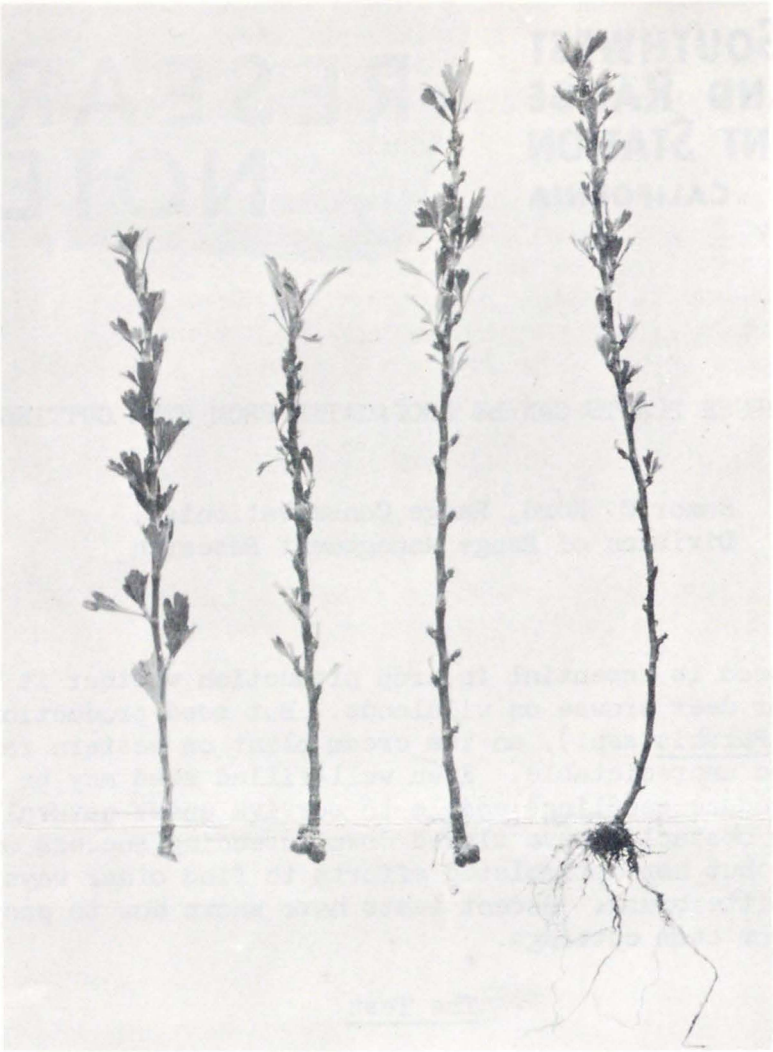

Figure 1.--Root development of antelope bitterbrush stem cuttings. From the left: cutting with heel of older wood, callus at 30 days, rooting at 45 days and at 2 months.

Sections of ripened hardwood 4-6 inches long were cut with a heel of older wood (fig. 1). These were moistened with water and dipped in a common rooting hormone preparation containing 0.1, 0.3, or 0.8 percent indol-3-butyric (IBA) acid in talc. The cuttings were labeled and planted about 1-1/2 inches deep in propagating flats. The rooting medium was made up of equal volumes of sand, sponge rock, and vermiculite which gave a neutral reaction (pH 7.0). A fungicide was mixed with the soil to minimize root-rot diseases. The flats were set on electrically heated bottom units that maintained temperatures between 65° and 70° F. The cuttings were sprinkled daily with water. Glass doors above the flats were opened during daylight to admit as much sunlight as possible to the plants.

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All cuttings were removed and examined at 30 days to check callusing or rooting development. Those with 1/2 inch or longer roots were transplanted to other containers and the remainder was returned to the flats. After 58 days all remaining cuttings were re-examined, and those which had subsequently rooted were transplanted.

## Results

Antelope bitterbrush treated with the lowest acid concentration gave the best rooting. Greenhouse and field stock gave 51 and 66 percent successful rooting, with an 0.1 percent acid concentration (table 1). Desert bitterbrush cuttings failed to root. More than half the stems had normal appearing and well developed callus when the test was stopped. Some of these probably would have rooted had they remained longer in the flats.

Both bitterbrush species produced healthy-looking callus during the first month. Many cuttings had 2- to 3-inch roots when the test was stopped (fig. 1). Root masses on antelope bitterbrush developed from both the callus and the stems above the callus. This indicates that roots may originate from both newly formed meristem as well as from root primordia of the pericycle. However, roots that dominated when the plants were 3 months old were all from above the callus. Those from the callus appeared dead.

Table 1.--Rooting success of bitterbrush stem cuttings treated with indol-3-butyric acid

| Source | Acid concentration | Cuttings | Callusing | Rooting at 58 days |
|---|---|---|---|---|
| | Percent | Number | Percent | Percent |
| Antelope bitterbrush: | | | | |
| Greenhouse | 0.1 | 33 | 64 | 51 |
| | 0.3 | 33 | 24 | 12 |
| | 0.8 | 33 | 33 | 0 |
| Field | 0.1 | 9 | 78 | 66 |
| | 0.3 | 9 | 22 | 11 |
| | 0.3 | 9 | 44 | 0 |
| Desert bitterbrush: | | | | |
| Greenhouse | 0.1 | 29 | 59 | 0 |
| | 0.3 | 28 | 25 | 0 |
| | 0.8 | 28 | 32 | 0 |

Normal development continued while the cuttings were in propagating flats. All stems produced leaves and a few flowered. Satisfactory growth continued after transplanting. The plants added up to 8 inches in height growth, and the roots spread throughout the available space within 3 months (fig. 2).

Successful rooting of biterbrush cuttings should help develop stocks of promising or elite strains which may prove valuable additions to the available bitterbrush plant varieties. Techniques for rooting this browse are simple and require only inexpensive facilities.

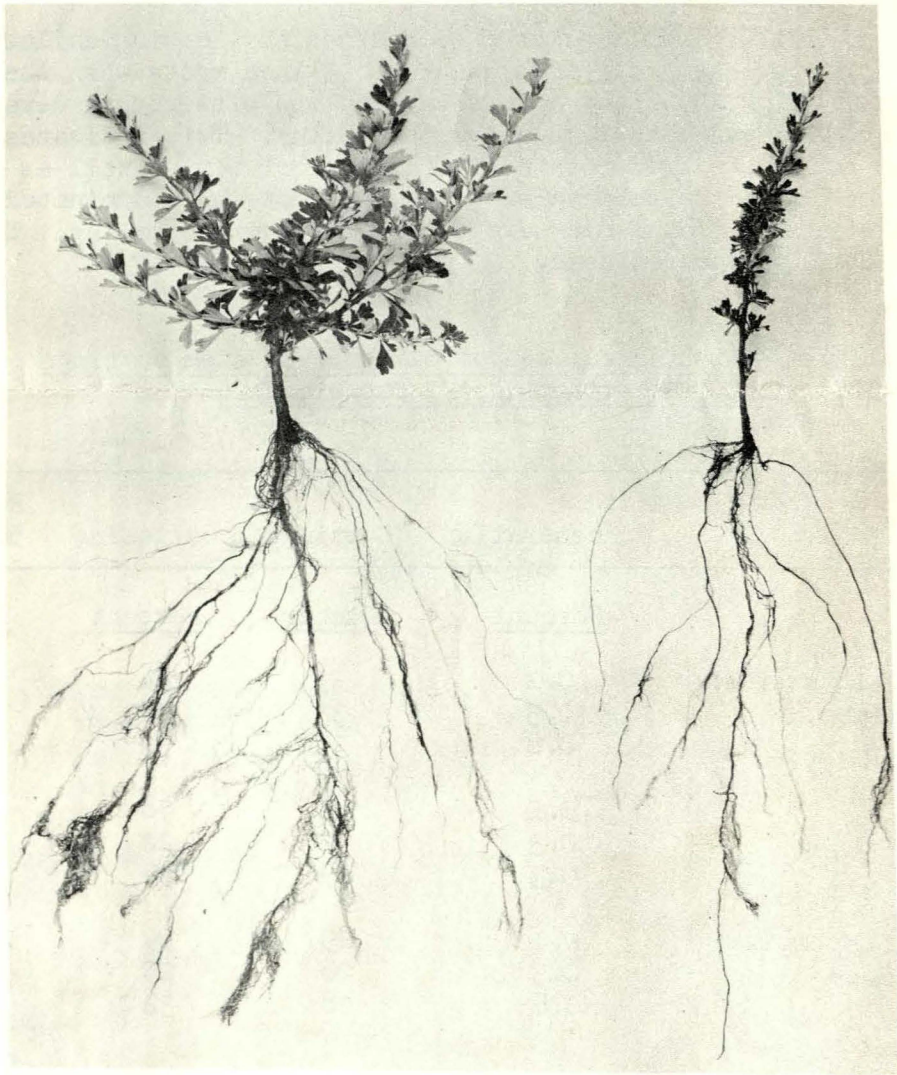

Figure 2.--Bitterbrush plants grown from stem cuttings. Both plants show growth 5 months after cuttings were made and 3 months after transplanting into larger containers.